

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
31 July 2003 (31.07.2003)

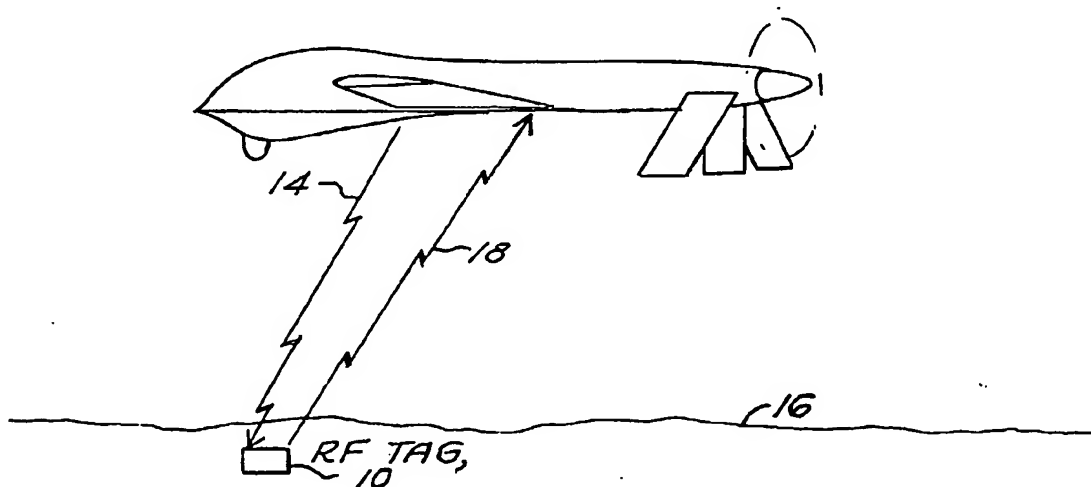
PCT

(10) International Publication Number  
**WO 2003/063368 A3**

- (51) International Patent Classification<sup>7</sup>: **G01S 13/06**, 13/42, 13/79
- (21) International Application Number:  
**PCT/US2003/002003**
- (22) International Filing Date: 22 January 2003 (22.01.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
60/350,575 22 January 2002 (22.01.2002) US
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report
- (88) Date of publication of the international search report:  
24 June 2004

[Continued on next page]

(54) Title: DIGITAL RF TAG



(57) Abstract: An RF tag (10) is provided to communicate with an interrogating source (14) in which the tag has programmability and flexibility to uplink data to multiple platforms. As such the RF tag (10) functions as a miniature programmable transceiver capable of communicating with a plurality of different platforms each having different waveform characteristics. With well-controlled spectral characteristics due to stored waveforms and the use of specialized direct digital up and down conversion techniques, data rates up to 256 kbps are achievable. The tag is thus capable of converting microwave signals directly to digital inputs, and the transmitter generates microwave signals (18) directly from digital outputs. Flexible digital processing also allows a throughput of 900 BOPS when using field programmable gate arrays.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/02003

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01S 13/06, 13/42, 13/79

US CL : 342/42, 44, 56, 133, 139, 146, 357.06, 357.07, 357.08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 342/42, 44, 56, 133, 139, 146, 357.06, 357.07, 357.08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, E	US 2003/0058163 A1 (ZIMMERMAN et al) 27 March 2003 (27.03.03), see Abstract and Figure 1 for position determination using GPS satellites.	1-22
Y, P	US 6,470,045 B1 (FUENTES) 22 October 2002 (22.10.02), see Abstract and Figure 2 for communication between interrogator and transponder using various types of well known coded modulation schemes, e.g. bi-phase modulation.	1-22
A, P	US 6,396,438 B1 (SEAL) 28 May 2002 (28.05.02), see Abstract and Figure 20 for determining the position of a RF tag transponder using phase shift keying signal.	1-22.
Y	US 5,982,322 A (BICKLEY et al) 09 November 1999 (09.11.99), see Abstract and Figures 1 and 3 for position locating rescue transceiver using GPS and bi-phase	1-22
Y	US 5,969,673 A (BICKLEY et al) 19 October 1999 (19.10.99), see Abstract and Figures 1 and 3 for position locating rescue transceiver using GPS and bi-phase modulation	1-22
A	US 4,746,830 A (HOLLAND) 24 May 1988 (24.05.88), see Abstract and column 4 for article tracking using coded modulation signals.	1-22
A	US 4,471,345 A (BARRETT, Jr.) 11 September 1984 (11.09.84), see Abstract and Figure 5 for tag communication system using bi-phase modulation and pseudo-random reply counter.	1-22

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:		"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier application or patent published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search

06 April 2003 (06.04.2003)

Date of mailing of the international search report

09 MAR 2004

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**INTERNATIONAL SEARCH REPORT**

PCT/US89/02003

**Continuation of B. FIELDS SEARCHED Item 3:**

**EAST**

search terms: search, rescue, bi-phase modulation, transponder, interrogation